ABSTRACT OF THE DISCLOSURE

A method and apparatus for fabricating a MEMS apparatus having a device layer with an optical surface that is supported by a pedestal on a planar support layer that is suspended for movement with respect to a base support by hinge elements disposed in a different plane from the planar support layer. The surface area of the optical surface is maximized with respect to the base support to optimized the fill factor of the optical surface and afford a high passband. The height of the pedestal is selected to position the device layer sufficiently above the base support to afford an unobstructed predetermined angular rotation about each axis. The hinges may be made of thin-film material, fabricated by way of surface micromachining techniques. The hinges are disposed underneath the device layer enabling the optical surface to be maximized so that the entire surface becomes usable (e.g., for optical beam manipulation). MEMS devices afford an array of MEMS mirrors with a high optical fill factor and high passband. Further, use of both bulk and surface micromachining techniques gives a MEMS device with a large and flat mirror and flexible hinges capable of a substantial rotational range at modest electrostatic drive voltages.